

Supplemental table 1 Physiological Parameters on Admission of ARDS Patients secondary to severe COVID-19 in the Corticosteroid Therapy and No Corticosteroid Therapy Groups

| Variables   | All patients<br>(n=774) | Glucocorticoid<br>(n=409) | No Glucocorticoid<br>(n=365) | p value |
|---|-------------------------|---------------------------|------------------------------|---------|
| <b>Epidemic disease history-n (%)</b>                               |                         |                           |                              |         |
| Influenza A   |                         |                           |                              | 0.395   |
| Negative  | 764 (98.7)              | 406 (99.3)                | 358 (98.1)                   |         |
| Positive  | 7 (0.9)                 | 2 (0.5)                   | 5 (1.4)                      |         |
| Unchecked or unknown  | 3 (0.4)                 | 1 (0.2)                   | 2 (0.5)                      |         |
| Influenza B   |                         |                           |                              | 0.877   |
| Negative  | 765 (98.8)              | 405 (99.0)                | 360 (98.6)                   |         |
| Positive  | 6 (0.8)                 | 3 (0.7)                   | 3 (0.8)                      |         |
| Unchecked or unknown  | 3 (0.4)                 | 1 (0.2)                   | 2 (0.5)                      |         |
| <b>HBV</b>  | 24 (3.1)                | 12 (2.9)                  | 12 (3.3)                     | 0.940   |
| <b>Signs and symptoms at admission-n (%)</b>                        |                         |                           |                              |         |
| Nasal congestion  | 10 (1.3)                | 7 (1.7)                   | 3 (0.8)                      | 0.349   |
| Nasal discharges  | 34 (4.4)                | 26 (6.4)                  | 8 (2.2)                      | 0.008   |
| Sore throat   | 27 (3.5)                | 10 (2.4)                  | 17 (4.7)                     | 0.139   |
| Cough   | 585 (75.6)              | 307 (75.1)                | 278 (76.2)                   | 0.785   |
| Expectoration   | 331 (42.8)              | 181 (44.3)                | 150 (41.1)                   | 0.416   |
| Dyspnea   | 512 (66.1)              | 280 (68.5)                | 232 (63.6)                   | 0.173   |
| Chest pain  | 24 (3.1)                | 11 (2.7)                  | 13 (3.6)                     | 0.623   |
| Headache  | 23 (3.0)                | 13 (3.2)                  | 10 (2.7)                     | 0.883   |
| Myalgia   | 83 (10.7)               | 38 (9.3)                  | 45 (12.3)                    | 0.212   |
| Fatigue   | 334 (43.2)              | 175 (42.8)                | 159 (43.6)                   | 0.885   |
| Gastrointestinal symptoms   | 167 (21.6)              | 98 (24.0)                 | 69 (18.9)                    | 0.105   |
| Moist rales   | 313 (40.4)              | 168 (41.1)                | 145 (39.7)                   | 0.758   |
| Crackles  | 76 (9.8)                | 41 (10.0)                 | 35 (9.6)                     | 0.759   |
| <b>Highest temperature during hospitalization, °C (median, IQR)</b> | 37.8 (37.1, 38.6)       | 38.0 (37.2, 38.8)         | 37.6 (37.0, 38.5)            | 0.007   |
| <b>Physiologic parameters</b>                                       |                         |                           |                              |         |
| Lac-mmol/L, Median (IQR)  | 1.5 (1.1, 2.2)          | 1.6 (1.2, 2.4)            | 1.4 (1.0, 2.0)               | 0.036   |
| NT-proBNP-pg/ml, Median (IQR)                                       | 846.5 (175.4, 2402.5)   | 1165.5 (257.1, 2158.3)    | 469.4 (86.6, 2677.0)         | 0.140   |
| ESR-mm/h, Median (IQR)  | 50 (32, 69)             | 49 (34, 70)               | 51 (31, 68)                  | 0.935   |
| INR, Median (IQR)   | 0.99 (0.92, 1.08)       | 1.01 (0.93, 1.10)         | 0.97 (0.91, 1.05)            | 0.004   |
| APTT-s, Median (IQR)  | 29.5 (24.9, 35.3)       | 29.9 (25.7, 35.7)         | 28.6 (24.6, 34.3)            | 0.010   |
| Fibrinogen-mg/dL, Median (IQR)                                      | 3.9 (3.2, 4.8)          | 3.8 (3.1, 4.7)            | 3.9 (3.2, 4.8)               | 0.816   |
| TT-s, Median (IQR)  | 16.8 (15.8, 18.1)       | 16.5 (15.4, 17.9)         | 17.1 (16.2, 18.4)            | <0.001  |
| Albumin-g/L, Median (IQR)   | 31.5 (28.2, 35.7)       | 31.3 (28.5, 35.4)         | 31.8 (28.2, 35.9)            | 0.395   |
| ALT-U/L, Median (IQR)   | 31 (20, 45)             | 31 (21, 45)               | 29 (19, 46)                  | 0.194   |
| AST-U/L, Median (IQR)   | 37 (27, 51)             | 40 (27, 55)               | 35 (27, 46)                  | 0.004   |
| BUN-mmol/L, Median (IQR)  | 5.3 (4.0, 7.5)          | 5.4 (4.1, 7.5)            | 5.2 (3.9, 7.5)               | 0.380   |
| CK-U/L, Median (IQR)  | 103 (55, 208)           | 119 (64, 258)             | 92 (51, 168)                 | 0.001   |

|                                |                       |                     |                     |        |
|--------------------------------|-----------------------|---------------------|---------------------|--------|
| CK-MB-U/L, Median (IQR)        | 14 (11, 20)           | 15 (11, 21)         | 14 (10, 18)         | 0.005  |
| Potassium-mmol/L, Median (IQR) | 3.9(3.5, 4.4)         | 4.0 (3.4, 4.4)      | 4.0 (3.6, 4.4)      | 0.076  |
| Sodium-mmol/L, Median (IQR)    | 139 (137, 141.)       | 139 (136, 141)      | 139 (137, 142)      | 0.282  |
| Chlorine-mmol/L, Median (IQR)  | 105 (102, 107)        | 105 (101, 107)      | 105 (102, 107)      | 0.388  |
| Calcium-mmol/L, Median (IQR)   | 2.03 (1.94, 2.13)     | 2.04 (1.93, 2.12)   | 2.03 (1.94, 2.14)   | 0.522  |
| Myoglobin-ng/mL, Median (IQR)  | 65.2 (35.8, 143.0)    | 78.2 (41.3, 186.1)  | 57.5 (33.9, 112.5)  | 0.018  |
| BNP-pg/mL, Median (IQR)        | 68.8 (32.7, 153.7)    | 77.7 (29.1, 174.2)  | 58.2 (32.8, 141.9)  | 0.278  |
| Ferritin-ng/mL, Median (IQR)   | 729.3 (410.9, 1181.2) | 864.7(573.3,1371.2) | 613.4(324.6, 961.7) | <0.001 |
| Prealbumin-g/L, Median (IQR)   | 97 (66, 137)          | 88 (59, 122)        | 103 (73, 155)       | <0.001 |

Abbreviation: ESR, Erythrocyte sedimentation rate; INR, International standardized ratio; APTT, Activated partial thromboplastin time; TT, Thrombin time; ALT, Alanine aminotransferase; AST, Aspartate aminotransferase; Lac: Lactate; BUN, Serum urea nitrogen; CK, Creatine kinase; CK-MB, Creatine kinase MB Form; BNP, Brain natriuretic peptide; NT-proBNP, Brain natriuretic peptide. WBC: White blood cell.

Supplemental table 2 Medical treatment among Severe COVID-19 Patients with ARDS in the Corticosteroid Therapy and No Corticosteroid Therapy Groups

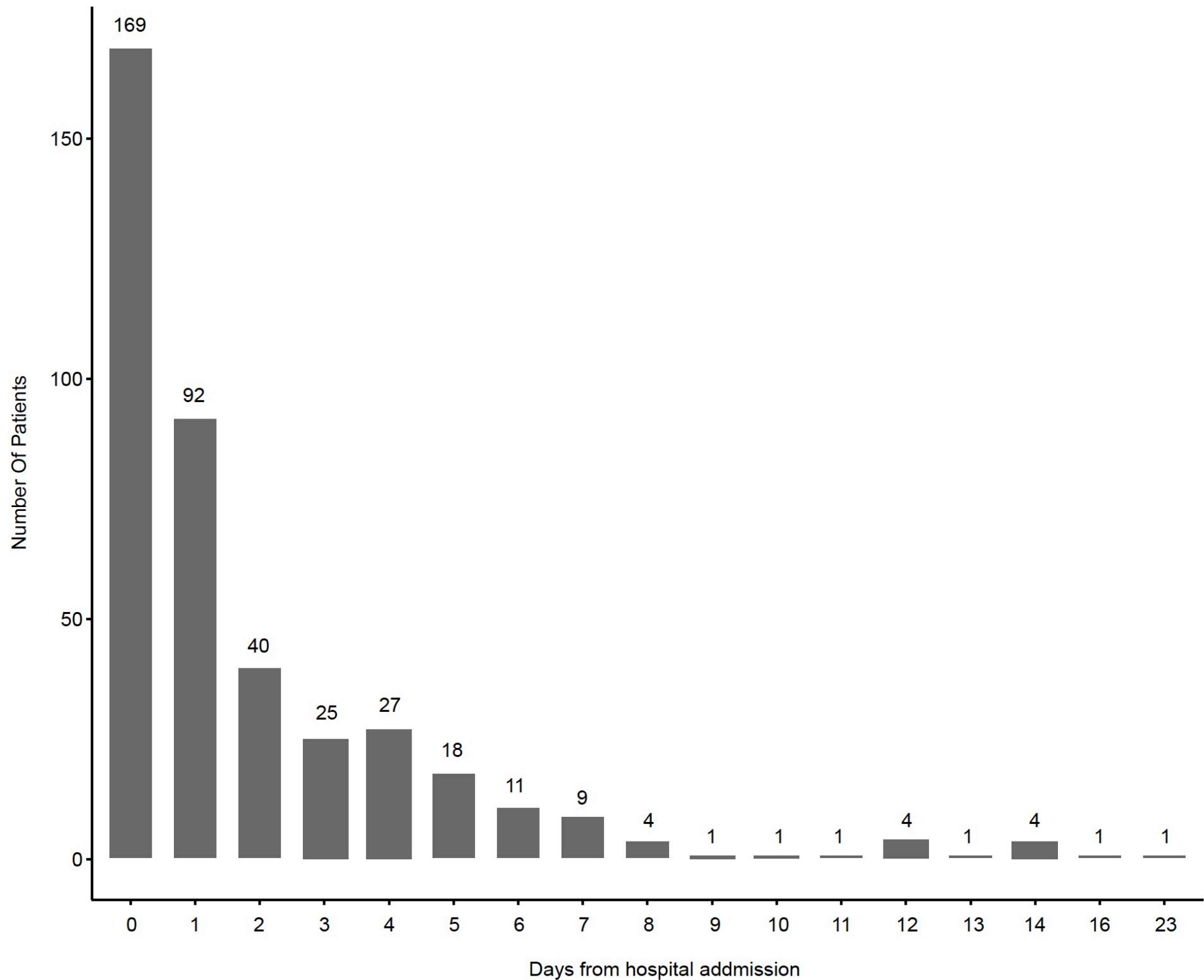
| Variable                       | Glucocorticoid (n=409) | No Glucocorticoid (n=365) | P      |
|--------------------------------|------------------------|---------------------------|--------|
| Antiviral drugs                |                        |                           |        |
| All, n (%)                     | 337 (82.4)             | 235 (64.4)                | <0.001 |
| Ganciclovir, n (%)             | 120 (29.3)             | 73 (20.0)                 | 0.004  |
| Interferon, n (%)              | 73 (17.8)              | 87 (23.8)                 | 0.049  |
| Oseltamivir, n (%)             | 34 (8.3)               | 35 (9.6)                  | 0.620  |
| Arbidol Hydrochloride, n (%)   | 93 (22.7)              | 68 (18.6)                 | 0.188  |
| Lopinavir and Ritonavir, n (%) | 106 (25.9)             | 57 (15.6)                 | <0.001 |
| Ribavirin, n (%)               | 176 (43.0)             | 79 (21.6)                 | <0.001 |
| Others, n (%)                  | 1 (0.2)                | 0 (0)                     | >0.99  |
| Antibiotics, n (%)             | 402 (98.3)             | 280 (76.7)                | <0.001 |
| Antifungals, n (%)             | 43 (10.5)              | 4 (1.1)                   | <0.001 |
| Human Immunoglobulin, n (%)    | 240 (58.7)             | 117 (32.1)                | <0.001 |

Supplement table 3 Secondary infections in the lower respiratory tract among Severe Patients with ARDS in the Corticosteroid Therapy and No Corticosteroid Therapy Groups

| Variable | Glucocorticoid (n=224)* | No Glucocorticoid | P value |
|----------|-------------------------|-------------------|---------|
| (n=145)* |                         |                   |         |

|                            |           |           |       |
|----------------------------|-----------|-----------|-------|
| All, n (%)                 | 31 (13.8) | 17 (11.7) | 0.636 |
| Bacterial infection, n (%) | 13 (5.8)  | 5 (3.4)   | 0.336 |
| Fungal infections, n (%)   | 18 (8.0)  | 12 (8.3)  | >0.99 |

\*The number is less than total number because not all the patients received sputum cultivation.



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**Supplemental figure 1** Time from corticosteroid therapy initiation to hospitalization. Day 0 includes patients who were already on corticosteroid therapy when hospitalized.